

# STUDY ON “VULNERABILITY OF AGRICULTURE SECTOR IN ALBANIA FROM CLIMATE CHANGE” POWERED BY THE INSTITUTE OF ENERGY, WATER AND ENVIRONMENT

**Aferdita LASKA MERKOCI<sup>1</sup>, Bashkim IDRIZI<sup>2</sup> & Mirela DVORANI<sup>3</sup>**

## ABSTRACT

Agriculture is one of the sectors identified as being sensitive to climate change. Climate change presents both opportunities and risks for agriculture. Countries where agriculture represents the main sector of economy and capacity to cope with changes is limited can enhance vulnerability of these societies. Vulnerability from climate change will depend on characteristics of the resources, geographic location, social and environmental conditions and technologies available to cope with risk.

This study aims to investigate the main factors that influence vulnerability of agriculture in Albania from climate change in a context of multiple risks. This study also illustrates the role that institutions, which deals with agriculture, plays to reduce or enhance vulnerability of agriculture. Qualitative interviews with specialists and researchers within agriculture and climate field and analysis of policy documents has been carried out in order to understand the nature of vulnerability.

The result indicates the presence of multiple risks that affects agriculture, which are associated to climatic and non climatic factors. These risks influences exposure and sensitivity of agriculture and consist of, drought, extreme weather events, land use, erosion, environmental conditions and soil conditions. Adaptive capacity of the farmers is identified to be very low and is influenced by several external and internal factors, which consists of economic conditions and financial resources, access to knowledge and information, market infrastructure, politics and limited support from the government. The results illustrates that changes in climate pattern are experienced together with wide range of non climatic risks which affects adaptive capacity, responses and the way in which agriculture is vulnerable to climate change. Current analysis of vulnerability shows that future vulnerability will be

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<sup>1</sup> **PhD. Aferdita LASKA MERKOCI**, aferditamerkoci@yahoo.it  
Polytechnic University of Tirana, Tirana, Albania  
Institute of Geoscience, Energy, Water and Environment  
Department of Climate and Environment

<sup>2</sup> **Assoc.Prof.Dr. Bashkim IDRIZI**, bashkim.idrizi@unite.edu.mk  
State University of Tetova. www.unite.edu.mk

<sup>3</sup> **Mirela DVORANI**,  
Polytechnic University of Tirana, Tirana, Albania  
Institute of Geoscience, Energy, Water and Environment  
Department of Water Economy

affected by economic situation, access to technology, institutions support and policies and in the nature and impact of climate change.

The study was of a big importance for the education process within the Department on Climate and Environment - Institute of Energy, Water and Environment of the Polytechnic University of Tirana. Through this study, where the students have been involved during whole period of research, they got theoretical knowledge and practical skills for analyzing the relations between the agriculture and climate in Albanian conditions. With this study, our department followed fully the contemporary trends of interactive and practical education system, by giving opportunity to its students to be involved in real research projects related to subject of their study!

**Key words:** vulnerability, climate change and risk, agriculture, adaptive capacity, exposure.

## 1. INTRODUCTION

Increase of population and human activity during the 20th century has strongly affected the climate system by increasing greenhouse gases in the atmosphere. Climate change is expected to have impact on both natural and human activities (IPCC, 2007a). Agriculture is one of the sectors identified as sensitive to climate. Climate change is expected to present both risks and opportunities for agriculture and its impact will differ depending on current climatic and soil conditions, resources available and infrastructure to cope with risks. (Olesen and Bindi, 2002). Impact of climate change may be substantial in countries where agriculture represents the main sector of economy and the resources available to cope with the risk of climate change are limited (IPCC 2007.b). Consequently, their economies will be more exposed from climatic risks, while other non climatic stressor can affect their capacity to manage risks and enhance vulnerability. According to IPCC (2007.b) vulnerability to climate change differs on the characteristic of the resources, geographic location, social and environmental conditions, available resources and technology to cope with risk. Developing countries are considered to be more vulnerable to climate change, because their economies depend on the sectors that are sensitive to climate change and have limitations on the financial resources, technologies available and institutional capability to cope with the risk of climate change. According to O'Brien et al, (2004) in developing countries a real concern is the impact of non climatic stressors where adaptation process is influenced by economic conditions, policy and institutional support, in addition to climatic stressors. Agriculture has historically been the main sector in Albanian economy. Agriculture constitutes around half of the GDP, around 50 % of the

population are employed in this sector while less than 60% of population lives in rural areas. (INSTAT, 2006). During the communist period agriculture was organized in cooperatives under the ownership of the state. After the system collapse on year 1991, agriculture was structured in very fragmented and small size farms. These farms are experiencing many problems related to the lack of technologies, investments, policies, support from government, imbalance between production, factors available to each farm and institutional structures that need to support efficiency in agriculture production (Zaloshnja 1997).

Despite current difficulties and problems that Albanian agriculture is facing, climate change represents another risk for this sector. Increase of temperature and decrease of precipitation will lead to drier conditions in this region and to lower yields, which will affect agricultural productivity and economies in this region. (Olesen and Bindi, 2002). Studies in vulnerability offer a framework for policy makers to respond to present conditions and in the same time to reduce future vulnerability from climate change (IPCC, 2007b).

The aim of this paper is to investigate the main factors that influence vulnerability of agriculture in Albania from climate change in a context of multiple pressures and risks. Particular focus will be put on addressing adaptive capacity that farmers have to adapt with the multiple risks. Moreover, this study aims to identify the role that institutions plays to reduce or enhance vulnerability of agriculture in Albania. The research questions are:

- What are the factors that influence vulnerability of agriculture in Albania?
- What determine the adaptive capacity of the farmers?
- How are the Albanian institutions coping with this issue?
- What are the policies and strategies formulated from these institutions and how these policies will affect vulnerability?

## 2. CLIMATE PROFILE OF THE STUDY ARREA

Albania is situated in the west of Balkan Peninsula, which covers an area of 28.745km<sup>2</sup>. Its terrain is mostly mountainous areas, where 77 % consist on mountainous and hills with an average altitude of 708 m (INSTAT, 2006). Population is approximately 3.12 million where urban population account for 45 % of total and 55% lives in rural areas, with overall density of population 166 km<sup>2</sup>. The main economic sectors are agriculture that accounts of 52% of total share of economy, industry that accounts for 13%, and other service 35%.

Albania is situated in the Mediterranean climatic belt, which is characterized by dry and hot summer and mild winter with abundant rainfall. The value of temperature varies from 7 °C on the highest zone (north of Albania) to 15°C in the coastal zone (UNFCC, 2003).

Climate is warmer in the southern part, relatively dry and is characterized by hot summer with an average temperature of 26°C. Winter is mild and wet with an average temperature of 9.8°C. In central and northern part of the country the average temperature is 23-24°C in the summer and 3-4 °C in the winter. The mean annual precipitation total over Albania is 1.485mm/year. The highest values of precipitation are during the period (October - November) and the lowest values during (July –August). The number of rainy days per year varies from 80-120 days / year (Qirjazi et al, 1997).The southern part has a small amount of rainfall where the values reach up till 600-1000 mm/ year. The highest values are observed in the northern part, where precipitation is approximately 2.800-3000 mm/year. The trend in temperature indicates an increase from 0.6°C in the north (Shkodra) and 0.4°C in south. This trend is observed also in the precipitation which has mainly decrease during the summer.

### 3. RESEARCH DESIGN

The aim of the study is focus on assessing vulnerability of agriculture sector in Albania. The method employed is qualitative approach. Qualitative methods are considered to be more exploratory in the nature of the phenomena. Often qualitative studies can help to explore and gain a novel understanding about different phenomena that are new and not developed.

Furthermore, qualitative methods are well suited for revealing different events and processes that take place in certain locations and affect people in different ways (Silverman, 2005; Creswell, 2003). In this study a combination of two qualitative methods was employed qualitative interview and text analysis of policy documents. Interviews were conducted with the aim to investigate the main elements that influence vulnerability of agriculture in national level. Different specialists from institutions, which deal with agriculture and environmental problems, were chosen in order to get a deeper understanding of major environmental and economic stresses that affects agriculture and farmers operation. Interviews were also conducted with researchers in the field of agriculture, environment and climate to get a scientific view about the topic.

As a complement to the interviews official documents from the Ministry of Agriculture and Environment were analyzed. The aim in the selection of these documents was to investigate the main policies projected for

agriculture and to explore how these policies will affect vulnerability of agriculture. The main documents used in this study are “Sector strategy of Agriculture and Food” and” Inter- Sectorial Rural Development Strategy”, provided by the Ministry of Agriculture, which is a part of the National Action Plan for the developments of agriculture sector and rural areas for the period 2007 -2013. Other documents used in this study are formulated from the Ministry of Environment and consist on “National Strategy of Environment”, and “Inter-sectorial Strategy of Environment”.

### *Planning the Interviews*

The form of interview chosen in this study is semi structured interviews. The main themes that interviews covered are:

- Environmental condition and land use
- Economic condition and access to technology
- Climate change and adaptation measure
- Information and knowledge
- Future

Questions were formulated in order to cover as much as possible of these themes which, on our opinion, are crucial for the vulnerability assessment in Albania.

### *Selecting respondents*

The respondents were selected within three institutions, i.e. Ministry of Agriculture, Ministry of Environment and Institute of Geographic Study Centre. The selection started in March 2008 by catching the right departments and specialists within mentioned institutions that are familiar with the topic and could provide relevant information. In the Ministry of Agriculture, the department of resource and service management which includes the sectors of land and management, irrigation and drainage, management of arable lands and sector of science was selected. In the Ministry of Environment the department that deals with the issue of climate change, which is actor of Albanian national action for climate change was selected. The other respondents were chosen in the Geographic Study Centre and Institute of Meteorology with researchers that cover the field of physical geography ,socio-economic geography and hydro meteorology.

### *Conducting interviews*

The interviews were done face to face with the respondents and in open ended questions. The interviews were based on the guide and themes

prepared beforehand. All the interviews were tape recorded. The duration of interview was about 1 hour. Further the interviews were transcribed. The transcription was made in the same day of the interview in order not to lose the context of the interviews.

### *Ethical issue*

The interviews were based on the objectives of the study and the themes prepared beforehand. The respondents were informed about the interviews in detail on time. The questionnaire was distributed by E-mail to all the respondents, before the interviews, since all of them wanted to know what type of question I was going to ask. All respondents were informed about the confidentiality of answers. Interviews were done in Albanian language and were translated in English, which may have affected the originality of the interviews and may have lead to the loss of some information.

### *Analysis of interviews and policy documents*

The empirical material is generated by interviews, notes kept during the interviews and written records. The process of analyzing the data involved different stages, such as preparing the data for the analysis, conducting analysis, moving deeper into understanding data, representing and interpreting the data gathered (Kvale, 1997; Creswell, 2003).

All the results from the respondents were brought together and summarized in answers, by taking care for similarities and differences, in way to reformulate the text in terms of categories and sub categories. In the last steps all the categories and themes were brought together and have framed the analysis.

The policy documents have gone through a text analysis which is defined as content analysis. The strength of the content analysis stands in its unobtrusive and non-reactive nature and can be conducted without disturbing the setting, while the researcher may determine where the emphasis lies (Krippendorff, 2004). Four themes were identified from the text sampling:

1. Land use management
2. Infrastructure and irrigation system
3. Access to technologies and information to farmers
4. Market and trading

### *Other research activities*

To frame the background of the study, literature review was carried out during the time of the study. Much information were collected on Linköping

University website - Science Direct and Scopus data base, IPCC website and website of climate change department in Albanian. Furthermore, the scenario of climate change made for Albania by UNEP was also utilized with the purpose to get an understanding of future vulnerability of agriculture.

### *Validity*

Validity refers to the truth of knowledge that is produced, accuracy finding and the consistency of the analysis and results (Kvale1997; Creswell, 2003). Moreover, in this study it was used the triangulation which refers to the combining of different methods and empirical material to produce more objective representation of the study (Silverman 2005). Based on triangulation concept the interview was checked and completed by the written documents from these institutions.

## **4. RESEARCH RESULTS**

The results are focused on the specialists and researchers point of view according to the main elements that influence vulnerability of agriculture. Bellow will be present both climatic and non climatic elements that influence exposure and sensitivity and also elements that influence adaptive capacity.

Agriculture represents the main sector of economy in Albania. The arable land comprise 24 % of the land, pasture 15 %, forestry 36 % and the remaining land 25%. About 4% of arable land lies in the coastal area in the western part of Albania (INSTAT, 2006). The general picture of agriculture is dominated by small family farms which now produce for family consumption and only a small part are market orientated (Shkreli, 2007). Albanian farmers are operating productions and market activities without any integrated system of technology institutions, agriculture research, policies and support. The level of technology is very low in the small farms. Production system remains very basic, yields are low and farms are too small and fragmented to be viable (Zaloshnja, 1997). Moreover, sustainable agriculture requires capital, new technology and good strategies and policies which should derive from Albanian institution and policymakers.

### *Elements that influence vulnerability*

Vulnerability is a function of three main elements: exposure, sensitivity and adaptive capacity, which are seen as inseparable from each other and as properties of a system. In this section Bellow will be present the factors,

generated from the respondents that determine exposure and sensitivity of agriculture in Albania.

#### - Exposure and sensitivity of agriculture in Albania

Agriculture was considered among the respondents, as one of the sectors that is exposed the most to different risks and stresses. They identify different forces that affect agriculture and operation of the farmers including climate, land use, environmental conditions, economic conditions and social conditions. These forces are not seen independently from each other.

According to the respondents, agriculture is exposed to a combination of different stresses which represent an obstacle for development of this sector. Climatic conditions, and land use and environment conditions were defend and stressed as risks affecting agriculture.

Climatic condition, which was mostly referred by the respondents as weather variation, was addressed as a problem, given the actual condition of agriculture. Drought and heavy rain were identified as main problems that have affected agricultural production so far. The main risks for agriculture identified from the respondents were the extreme weather events.

Whereas, during the winter and spring agriculture is exposed to the risk of heavy rain and hails, thus, several agriculture lands near to rivers and sea has been flooded and damaging agricultural land and production. Another problem cited form the respondents were also the changes that has been observed regarding the timing of cultivation and harvest. This has created a disorder among farmers. Also, it is observed increase of risks from the pest diseases that are becoming a big problem for many agricultural crops.

Land use and environmental condition was also emphasized as risk for the agriculture and at same time influencing sensitivity of farmers operation. One of the main problems that all respondents identified as an obstacle for agriculture is land abandonment, started after 1990 and is driven by different factors. The tendency of the migration has been to move from rural areas to urban areas and from the high hill zone to low lands zone. Low efficiency of farms, erosion, abandonment of the land, degradation of land, urbanization of land, deforestation, soil contamination and fragmentation were also emphasized as another driving force for this process.

#### - Adaptive capacity

While agriculture is exposed to a range of varieties of conditions, the degree to which is vulnerable will depend also on the ability to cope and to adapt .The ability of a system to adapt is the determinant of adaptive capacity. Local adaptive capacity is reflective to broader conditions of a system and is



determined by a range of internal factors such as financial resources, access to technology, information and knowledge and external factors such as, market and infrastructure, politics and policies. As presented in the section above agriculture sector is not exposed only to climate risk, but also to a wide range of non climatic factors that influences the ability of the system to cope with the risk. In this section I will present both internal and external factors that influence the adaptive capacity of farmers to cope with risk.

### *Internal factors*

#### →Financial resources and access to technology

One of the factors that influence adaptive capacity is financial resources of the farmers and access to technology. In general all respondents consider that the resources available for agriculture to adapt to climate change are very low. Fragmentisation of the farms is one of the main factors that limit financial resources. This has created difficulties for the efficiency of the farms, as result small size of the farms has condition the productivity which is very low and at the same time, the costs and inputs are very high for the production.

Consequently, farms do not create enough financial resource for the farmers to invest in fertilizers, new varieties and technologies. Moreover, financial resources create difficulties in implementing measures to cope with climatic risks. Another policy encompasses investments in the extensive centers which work closely with farmers.

Another section of this policy comprises increasing the level of mechanization of the farms. The measure that will be employed will consist in loans and grant schemes for investments in technologies by subsidizing the interest rate of private banks for the farmers' loan. Moreover this policy include also establishing local funds that can motivate local initiatives

#### →Information and access to knowledge

During the interviews it was observed that most of the respondents have limited information regarding climate change, which has also affected the information of the farmers about climatic risk. It is important operation of Meteorological centers, which so far has been in a stage of stagnation and not functioning. The small numbers of Meteorological centers and the actual condition they are in, do not provide enough information to help and protect farmers from these risks. Awareness among institutions in Albania is identified to be very limited and will also affect the action and policies for climate.

### *External factors*

→ Market and infrastructure

According to the respondents, farmers are weak towards competition because of the low productivity in terms of quantity and quality. The small size of the farms, lack of technologies and lack of financial resource to invest in new technologies, in cultivars and fertilizer, result in higher cost of the production. This creates difficulties for the farmers to compete in the market.

In addition, lack of market facilities represents another problem for the farmers. The support from the government has been limited. Other external factors cited from the respondents causing problems in rural areas are problems with electricity; lack of medical infrastructure such as hospitals, ambulances and other rural services.

→ Politics

The actual political situation is also identified as a barrier for development of agriculture and at the same time enhancing adaptive capacity. The support from the government has not been sufficient for the farmers. The Ministry of Agriculture has not taken any measures in order to orient farmers for using new cultivars that can be resistant or organizing workshops that can increase the awareness among farmers for the risk that climate change represents.

Unstable political situation, in terms of administrative compartment of the municipalities and villages, was also cited as a problem for agriculture. During the political election, the government has changed continuously administrative division of municipalities and villages for political purposes. Consequently, it has created confusion for the municipalities in terms of management and administration of their territory because of continuous changes of the borders.

## **5. DISCUSSION**

### *Emerging vulnerabilities*

The results show several factors that influence the vulnerability of the agriculture sector identified by specialists. As presented in the results, agriculture is exposed to several climatic risks that have influenced productivity and operations of the farmers. Drought was cited as the main problem, where summer was characterized by large amounts of days with higher temperature and lack of rainfall. Also, there is an increase in risk for floods as a result of heavy rain and river deterioration. There are other risks that were identified

associated with lack of financial resources, land abandonment, environmental conditions, which influence agriculture negatively. Thus, changes of climate pattern are experienced together with non climatic factors that influence farmers operations.

Interaction of various risks influences exposure and sensitivity of agriculture and capacity to cope with climatic risks (Believe et al 2006, O'Brien et.al, 2004) Hence, farmers are operating under different stresses and work in a multi-risk environment which influence their operations and enhance vulnerability.

Privatization and land reform has led to a highly uncertain situation in terms of landownership. This situation has given rise to conflicts between farmers and has negatively affected investments and loans from banks. In such uncertain situations banks and investors have not credibility to invest.

The results from the interviews show that unstable political situation within the government and economic problems that Albania is facing, has constrained the support from the government. There is also observed lack of concrete action and planning regarding agriculture. Moreover, policies and practices employed so far have been very few and not successful.

#### *Future vulnerability to climate change*

Climate change is expected to have impact on natural and socio-economic systems. According to UNEP (1996) there may be an annual increase of temperature to 1 °C, 1.8°C and 3.6°C respectively by 2025, 2050 and 2100 and decreasing in precipitation up to -3.8%, -6.1%, -12.5% in the same time horizon. The expected impact in agriculture will consist on modification of rainfall, evaporation and soil moisture that will lead to increasing demand of water and irrigation system. There are expected changes in growing cycle, harvest time and in the quality of agricultural products.

Such climatic changes may also increase the risk for exposure. Higher temperatures and decrease in precipitation will increase the demand of water. Since irrigation system in Albania is not covering the whole arable land and a major part of it is nonfunctional, there will be risk for water supply for agriculture. Furthermore, the energy sector in Albania is a large consumer of water. Changes in precipitation will increase competition between agriculture and energy.

Analysis of current adaptive capacity indicates that ability of farmers to cope with changes is very low. Thus, economic resources will create difficulties for investing in irrigation technology in order to cope with drier conditions. Hence restricted access to water will reduce farmer's adaptive capacity and increases vulnerability to climatic risks (Belliveau et al 2006).

Government policies play a significant role for reducing future vulnerability to climate change and facilitating adaptation. This includes reducing vulnerability of people and infrastructure, providing information about the risks, investments in new technology in order to facilitate adaptation and enhancing adaptive capacity to cope with risk (IPCC 2007b, Adger 2006). In addition, improvement of legislation control on the products quality that can be alienated with EU standards also will have positive impact in increasing the competition and to increase the exports of agricultural products in EU countries.

## 6. CONCLUSIONS

The objective of this study has been to identify elements that influence vulnerability of agriculture in Albania in context of multiple risks. Qualitative interviews with specialists within institutions that deal with agriculture and analysis of policy documents has been carried out, in order to understand the nature of vulnerability of agriculture.

The results in this study indicate the presence of multiple risks that affects agriculture which are associated to climatic and non climatic factors. The challenge for the agriculture sector associated to climate change is the availability of water. Increase of temperature and decrease of precipitation will restrict access to water. This will result in reducing adaptive capacity of farmers and enhance vulnerability to climatic risks.

Other risks associates to climate change are also extreme weather events that will pose a challenge for agriculture. Lack of support from the government and lack of insurance for the crops will creates difficulties for the framers to manage such risks.

Other non climatic factors that influence vulnerability of agriculture include soil condition erosion, environmental condition, land use, land ownership, market and infrastructure. These elements make agriculture more sensitive to any climatic risk and also show the presences of multiple exposure and risks which influence vulnerability to climate change.

Adaptive capacity is determined by internal factors that consist of access to finance, access to technology, information and knowledge. Other external factors such as market and infrastructure create obstacles to cope with climatic risks. This shows that climatic risks are experienced together with a variety of non climatic risks which affects adaptive capacity and responses. Current responses in managing risks are considered very low and mostly consist on short term adaptation practices. Results show that current adaptive capacity to cope with climatic risks is very low, which result in emerging vulnerabilities for the agriculture.

Policies formulated from the institutions that deals with agriculture consist mainly on financial support for farmers, investing in technology, diversifying the economy in the rural areas and consolidation of the farms. The focus of these policies is more toward structuring and developing agriculture, without addressing climatic risks. Hence, these policies have limitations in terms of reducing vulnerability from climate change of agriculture. Analysis of current vulnerability indicates that, future vulnerability will be affected by economic situation, access to technology, institutions support and in the nature and impact of climate change.

## REFERENCES

1. Adger .W.N (2006) Vulnerability Global Environmental Change vol 16 pp268-281
2. Available/.http/www.fao.org/sard/common/ecg/2977/en/SARDMcountryassessmentAlbaniaFinal.pdf UNEP: Implications of Climate Change for the Albanian Coast. MAP Technical Reports Series No.98, UNEP, Athens, 1996.
3. Belliveau, S.Smith, B.Bradshaw, B. (2006).Multiple exposure and dynamic vulnerability: Evidence from the grape industry in the Okanagan Valley, Canada. Global environmental change vol 16, pp 364-378
4. Creswell, J. (2003).Research design .Qualitative and quantitative and mixed methods
5. Instituti i Statistikes Shqiptare ( INSTAT 2006).Shqiperia ne shifra.
6. IPCC (2007a) Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change., United Kingdom and New York, NY, USA: Cambridge University Press, Cambridge,
7. IPCC Fourth assessment report (2007.b) Working group II report “Impact, Adaptation and vulnerability “University Press, Cambridge, United Kingdom and New York, NY, USA.
8. Krippendorff, K (2004) .Content Analysis .An introduction to its methodology. Thousand Oaks-London-New Delhi. Sage Publication
9. Kvale .S(1997)Interviews. An introduction to qualitative research interviewing. Thousand Oaks-London-New Delhi. Sage Publication
10. OBrien,K.Leichenko,R,Kelkar,U.Venema,H.Aandahl,G.Tompkins,H.Javed,A.Bhadwal,S.Bar g,S.Nygaard ,L.West ,J(2004)Mapping vulnerability to multiple stressors: climate change and globalization in India.

11. Oelesen .J, Bindi .M (2002) Consequences of climate change for European agricultural productivity, land use and policy European Journal of Agronomy vol 16 pp 239-262
12. Qirjazi, P.Samimi, E, Sala, S, Dollma, M, Ciba, A.(1997)Environmental information systems in Albania. Assessment Reports .Geographic study centre. Tirana, Albania.
13. Shkreli, E( 2007)Assessment of strength and weaknesses of mountain polices in south East Europe. Project for sustainable agriculture and rural development in Mountain regions (SARD-M).National report of Albania
14. Silverman, D. (2005) Interpreting Qualitative Data. Methods for Analyzing Talk Text and Interaction. London, Thousand Oaks & New Dehli: Sage Publications.
15. UNFCCC (2002).The first national communication of the Republic of Albania to the United Nation.
16. Zaloshnja, E (1997) Analysis of agricultural production in Albania: Prospect for policy improvement. PhD. University of Virginia.